



# SLOVENSKI STANDARD

## SIST EN 1434-1:2016

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Nadomešča:  
SIST EN 1434-1:2007

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### Merilniki toplote - 1. del: Splošne zahteve

Heat meters - Part 1: General requirements

Wärmezähler - Teil 1: Allgemeine Anforderungen

Compteurs d'engine thermique - Partie 1: Prescriptions générales

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Ta slovenski standard je istoveten z ~~SIST EN 1434-1~~ **EN 1434-1:2015**

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EUROPEAN STANDARD

EN 1434-1

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November 2015

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English Version

## Heat meters - Part 1: General requirements

Compteurs d'énergie thermique - Partie 1:  
Prescriptions générales

Wärmezähler - Teil 1: Allgemeine Anforderungen

This European Standard was approved by CEN on 5 September 2015.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**EN 1434-1:2015 (E)****European foreword**

This document (EN 1434-1:2015) has been prepared by Technical Committee CEN/TC 176 "Heat meters", the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1434-1:2007.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

EN 1434, *Heat meters* consists of the following parts:

- ITEH STANDARD PREVIEW**  
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- *Part 1: General requirements*
  - *Part 2: Constructional requirements*
  - *Part 3: Data exchange and interfaces*<sup>1)</sup> [SIST EN 1434-1:2016](https://standards.iteh.ai/catalog/standards/sist/37e67a90-0f3b-4b37-b069-a2528270c094/sist-en-1434-1-2016)
  - *Part 4: Pattern approval tests*
  - *Part 5: Initial verification tests*
  - *Part 6: Installation, commissioning, operational monitoring and maintenance*

In comparison to EN 1434-1:2007, the following changes have been made:

- special cases for combined cooling and heating meters are added;
- additional functionality for smart metering applications are added;
- metrological requirements for smart metering applications are added;
- definitions and requirements for the cooling meter are added;
- tariff meters are added;
- terms and definitions, requirements for registration devices and cooling meters are added;
- requirements for fast response meters are added (informative Annex C).

<sup>1)</sup> EN 1434-3 is maintained by CEN/TC 294.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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## EN 1434-1:2015 (E)

## 1 Scope

This European Standard specifies the general requirements for heat meters. Heat meters are instruments intended for measuring the energy which in a heat-exchange circuit is absorbed (cooling) or given up (heating) by a liquid called the heat-conveying liquid. The heat meter indicates the quantity of heat in legal units.

Electrical safety requirements are not covered by this European Standard.

Pressure safety requirements are not covered by this European Standard.

Surface mounted temperature sensors are not covered by this European Standard.

This standard covers meters for closed systems only, where the differential pressure over the thermal load is limited.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1434-2:2015, *Heat meters — Part 2: Constructional requirements*

EN 1434-4:2015, *Heat meters — Part 4: Pattern approval test*

EN 60751, *Industrial platinum resistance thermometers and platinum temperature sensors (IEC 60751)*

EN 61010-1, *Safety requirements for electrical equipment for measurement, control and laboratory use — Part 1: General requirements (IEC 61010-1)*

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## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1 response time

$\tau_{0,5}$   
time interval between the instant when flow or temperature difference is subjected to a specified abrupt change and the instant when the response reaches 50 % of the step value

### 3.2 fast response meter

meter suitable for heat exchanging circuits with rapid dynamic variations in the exchanged heat

Note 1 to entry: See also Annex C.

### 3.3 rated voltage

$U_n$   
voltage of the external power supply required to operate the heat meter, conventionally the voltage of the AC mains supply

### 3.4 rated operating conditions

conditions of use, giving the range of values of influence quantities, for which the metrological characteristics of the instrument are within the specified maximum permissible errors



**3.5****reference conditions**

set of specified values of influence factors, fixed to ensure valid inter-comparison of results of measurements

**3.6****influence quantity**

quantity, which is not the subject of the measurement, but which influences the value of the measurement and or the indication of the measuring instrument

**3.7****influence factors**

influence quantity having a value within the rated operating conditions

**3.8****disturbance**

influence quantity having a value outside the rated operating conditions

**3.9****Types of errors****3.9.1****error (of indication)**

indication of the measuring instrument minus the conventional true value of the measurand

**3.9.2****intrinsic error**

error of a measuring instrument determined under reference conditions

**3.9.3****initial intrinsic error**

error of a measuring instrument as determined once prior to performance tests and durability tests

**3.9.4****durability error**

difference between the intrinsic error after a period of use and the initial intrinsic error

**3.9.5****maximum permissible error****MPE**

highest values of the error (positive or negative) permitted

**3.10****Types of faults****3.10.1****fault**

difference between the error of indication and the intrinsic error of the instrument

**3.10.2****transitory fault**

momentary variations in the indication, which cannot be interpreted, memorized or transmitted as measurements

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**EN 1434-1:2015 (E)****3.10.3****significant fault**

fault greater than the absolute value of the MPE and not being a transitory fault

Note 1 to entry: If the MPE is  $\pm 2\%$  then the significant fault is a fault larger than  $\pm 2\%$ .

**3.11****reference values of the measurand****RVM**

specified value of the flow rate, the outlet temperature and the temperature difference, fixed to ensure valid intercomparison of the results of measurements

**3.12****conventional true value**

quantity value attributed by agreement to a quantity for a given purpose

Note 1 to entry: A conventional true value is, in general, regarded as sufficiently close to the true value for the difference to be insignificant for the given purpose.

EXAMPLE A true value is the heat coefficient according to Annex A.

**3.13****meter model**

different sizes of heat meters or sub-assemblies having a family similarity in the principles of operation, construction and materials

**3.14****electronic device**

device employing electronic elements and performing a specific function

**3.15****electronic element**

smallest physical entity in an electronic device which uses electron hole conduction in semi-conductors, or electron conduction in gases or in a vacuum

**3.16****qualifying immersion depth of a temperature sensor**

immersion depth over which the sensor measures with an accurate temperature value

Note 1 to entry: The conditions to define the qualified immersion depth are written in EN 1434-4:2015, 7.4.4.1.

**3.17****self-heating effect**

increase in temperature signal that is obtained by subjecting each temperature sensor of a pair to a continuous power dissipation of 5 mW when immersed to the qualifying immersion depth in a water bath, having a mean water velocity of 0,1 m/s

**3.18****heat meter**

instrument intended for measuring the energy which in a heat-exchange circuit is absorbed (cooling) or given up (heating) by a liquid called the heat-conveying liquid

### 3.19 meters other than for heating

#### 3.19.1 cooling meter

heat meter designed for cooling applications at low temperatures, normally covering the temperature range 2 °C to 30 °C and  $\Delta\theta$  up to 20 K

#### 3.19.2 bifunctional meters for change-over systems between heating and cooling

instrument measuring heating and cooling energy in two separate registers

Note 1 to entry: In other directives and requirements, bifunctional meters are called combined meters.

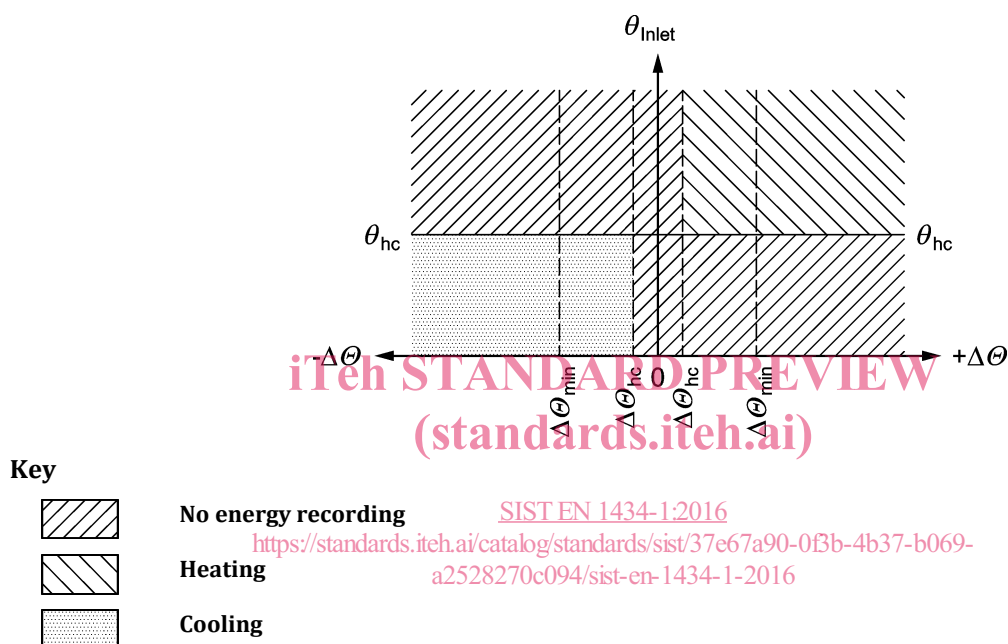


Figure 1 — Example for function of heating and cooling register

### 3.20 flow direction

direction of the liquid going through the system from inlet to outlet

Note 1 to entry: The inlet is for the heating case the hot side and for the cooling case the cold side.

Note 2 to entry: In the literature the word “flow” is also being used for “inlet”, and the word “return” is also being used for “outlet”.

Note 3 to entry: Different temperature values for  $\theta_{hc}$  for heating and cooling applications may also occur.

### 3.21 electrical pulse

electrical signal (voltage, current or change in resistance), that departs from an initial level for a limited duration of time and ultimately returns to the original level

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## 3.22

**pulse output and input devices**

## 3.22.1

**pulse output device**

functional part of flow sensor, calculator or auxiliary devices

EXAMPLE Remote displays or input devices of control systems.

## 3.22.2

**pulse input device**

functional part of flow sensor, calculator or auxiliary devices

EXAMPLE Remote displays or input devices of control systems.

## 3.23

**maximum admissible temperature**

maximum temperature of the heat conveying liquid the meter can withstand in combination with the maximum admissible working pressure and the permanent flow rate for short periods of time (< 1 h / day; < 200 h / year) without a significant fault after the exposure to this maximum admissible temperature

## 3.24

**durability**

characteristic of a measuring instrument to keep the metrological characteristics over time (e.g. to fulfil the double of MPE), provided that it is properly installed, maintained and used within the permissible environmental conditions

## 3.25

**long life flow sensor**

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flow sensor designed to have a longer lifetime than a normal flow sensor, which typically has a durability of 5 years under the specified operating conditions

## 3.26

**user interface**

interface forming part of the instrument that enables information to be passed between a human user and the measuring instrument or its components (e.g. display)

## 3.27

**communication interface**

electronic, optical, radio or other technical interface that enables information via correct transceiving of at least thermal energy to be passed between measuring instruments, sub-assemblies or external devices

## 3.28

**meter for smart metering**

heat meter or cooling meter with the capability of data communication and support of smart metering functionalities

Note 1 to entry: Data could be transmitted via user interface and/ or communication interface in fixed time intervals and/or on request.

Note 2 to entry: For more information on smart meters, see standard series EN 13757 and CEN/CLC/ETSI/TR 50572.